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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HOFFMAN WARNICK & D'ALESSANDRO, LLC			KYLE, MICHAEL J	
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DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/624,338	Applicant(s) GRONDAHL, CLAYTON M.	
	Examiner Michael J. Kyle	Art Unit 3677	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
4a) Of the above claim(s) 25 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-24 and 26 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/2/06.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1, 9, 24, and 26 are objected to because of the limitations regarding the longitudinal and radial axes of the component to be sealed against. It is unclear if applicant is attempting to claim the component in combination with the seal. As presented, only the seal is claimed (based on the preamble). If only the seal is to be claimed, references to other components that are not part of the invention should be prefaced by “adapted to” or “for” language.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-5, 8-17, 19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayr (U.S. Patent No. 6,059,526) in view of Webster et al (“Webster”, U.S. Patent No. 6,220,602). With respect to claims 1, 8-10, 19, and 23, Mayr discloses a seal assembly comprising a brush seal (30-32) with a plurality of staggered seal members, and a support (33-35) coupled to the seal, having a portion facing the high pressure side of the seal. A free portion of the seal (31) is angled relative to a longitudinal axis and all radial axes of a component to be sealed against (“approximately a right angle” in column 2, line 13, includes a range of angles that are not 90 degrees, and thus angled with respect to a radial direction) and contacts a distal end (shown in figure 1b) in the pressurized operative state, and is out of contact

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in an unpressurized inoperative state (see figure 1a). The seal has a fixed portion (32) that is angled relative to free portion (31) in both operative and inoperative states and is substantially parallel to the a longitudinal axis of a component to be sealed against. The seal is used in a rotary machine. Mayr further discloses the fixed portion is positioned substantially perpendicular to a longitudinal axis of a component to be sealed (see figure 2), and the free portion is angled out of plane. Mayr discloses the seal to be brush seal, not a leaf seal as claimed.

4. Webster teaches a seal arrangement where either a brush seal or leaf seal may be used (column 7, lines 44, 45), thereby establishing the seals as equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use either a brush seal or leaf seal, as Webster teaches these seals to be equivalent and interchangeable.

5. With respect to claims 3-5, 14, 21, and 22, Mayr discloses the support to include a curved surface (on 33) extending from a proximate end of the support to a distal end. The free portion extends tangentially from the curved surface in the inoperative state. The proximate end is coupled to a mount portion (36). The free portion (31) is closer to the component to be sealed against (10) in the operative state.

6. With respect to claims 11-13, Mayr discloses a distal end of the support portion is thinner (at the beaded portion contacting 31) than a proximate end of the support portion (at 33, shown in figure 1b). Mayr also shows a curved surface extending from the proximate end to the distal end, and the support is coupled to a mount portion (36) that mounts the support to a stationary component.

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7. With respect to claim 15, Mayr discloses a holder (36) that mounts the seal assembly to a stationary component and includes a projection (top of 36, figure 1) that protects the free portion.

8. With respect to claims 16 and 17, the combination of Mayr and Webster teaches the fixed portion (32) to be provided by an arcuate member in each leaf seal member. Examiner notes that because the seal extends around a rotary shaft, it is essentially circular, which will include arced portions. Mayr shows the free end portion to be circumferentially parallel to a surface of the rotatable component (figure 2).

9. Claims 2, 18, 20, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayr in view of Webster as applied to claims 1, 9, and 19 above, and further in view of Halowach et al ("Halowach", U.S. Patent No. 4,813,608). Mayr and Webster fail to disclose the leaf seal layers to be made from different materials, where a first material addresses a high pressure side of the seal and a second material addresses a low pressure side of the seal, where the material has a lower coefficient of thermal expansion than the second material.

10. Halowach discloses a leaf seal assembly (40) comprising two layers of different material with different coefficients of thermal expansion. The two layers are bonded together, such that the different rate of expansion between the two layers causes the seal to bend in a preferred direction, which results in the formation of a tight air seal between adjoining structures (column 2, lines 13-24). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Mayr and Webster as taught by Halowach, such that the layers are made of materials with different coefficients of thermal expansion, so that the differing rates of expansion causes the seal to bend, forming a tight air seal between the structures. .

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11. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayr in view of Webster as applied to claim 1 above, and further in view of Mackay et al (“Mackay”, U.S. Patent No. 5,042,823). Mayr and Webster fail to disclose the plurality of staggered leaf seal members (3, 4) to be provided by a single strip of material.

12. Mackay teaches a leaf seal arrangement (54) made from single strip of material.

Manufacturing a multi-layered seal from a single strip of material lowers manufacturing costs because the seal can then be assembled in a simpler fashion, as opposed to cutting two different layers to length and connecting the layers together to form the seal. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Mayr and Webster as taught by Mackay, such that the seal is made from a single strip of material, in order to reduce manufacturing costs. Mackay further discloses the leaf seal members to be fixed by a weld.

13. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gail et al (“Gail”, U.S. Patent No. 6,353,263) in view of Webster. Gail discloses a method of fabricating a seal assembly comprising the steps of forming a frustoconical brush seal member (1) with a fixed portion (6) angled relative to a free portion (7) in operative and inoperative states. Examiner notes the Gail discloses the angle between portions (6) and (7) to be “approximately” ninety degrees (column 4, lines 6). Because this is an “approximate” angle, it includes angles that are not ninety degrees, which would provide a frustoconical shape. Also, for this reason, the free portion is angled relative to both a longitudinal axis and all radial axes of a component to be sealed against. The brush seal is coupled to a support (9), such that the free portion (7) contacts a distal end of the support portion (11) in an operative state, and is out of contact with the distal

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end in the inoperative state (separated by gap 12). Gail only discusses the use of a brush seal, not a leaf seal as claimed.

14. Webster teaches a seal arrangement where either brush seal or leaf seal may be used (column 7, lines 44, 45), thereby establishing the seals as equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use either a brush seal or leaf seal, as Webster teaches these seals to be equivalent and interchangeable.

Response to Arguments

15. Applicant's arguments filed June 8, 2006, have been fully considered but they are not persuasive.

16. Applicant argues that Mayr fails to teach the free portion being out of contact with the distal end of the support in an inoperative state. Examiner respectfully disagrees and refers to figures 1a and 1b showing the seal out of contact, and in contact with a distal end in the inoperative and operative states, respectively.

17. Applicant argues that Mayr shows the bristles to be out of contact with the distal end of the support in the operative state. Examiner respectfully disagrees and notes that in figure 1b, the bristles come into contact with a distal end of the support (33). Applicant also alleges that this portion is "not a distal end", but fails to support or explain this conclusion.

18. Applicant argues that that Webster teaches away from Mayr. Examiner respectfully disagrees and notes that Webster explicitly teaches leaf seals and brush seals to be equivalent.

19. Applicant argues that the leaf seal of Webster is clearly different from the leaf seal of the present invention. Examiner respectfully disagrees and notes that the leaf seal of the present invention is only nominally claimed, and is not limited by any further description in the claims.

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Applicant relies on the functioning of the leaf seal to differentiate it from the Webster's prior art leaf seal. Applicant is reminded that an apparatus must be distinguished from the prior art in terms of structure, rather than function (MPEP 2111⁴).

20. With respect to claims 3-5, 14, 21, and 22, applicant argues that Mayr does not show a curved surface on the support from the proximate end to the distal end. Examiner disagrees and notes the lower surface of the support in figures 1, 1a, and 1b, includes a surface that is curved along its length.

21. Examiner notes the typographical error in identification of the component to be sealed against. This has been relabeled as element (10) in Mayr. It is noted that the component is not claimed in combination with the seal, and is treated only as an intended use recitation. As such, the situation exists, depending on the structure of the component, where the deflected bristles move closer to the component. For example, in Mayr's figure 2, upon deflection of the bristles (As shown in 1b) there is a slight linear displacement. This displacement moves the seal closer to element 10, which is the element sealed against.

22. Applicant argues that Mayr does not show the support being thinner at a distal end. Examiner respectfully disagrees, and reiterates that this is clearly shown in figure 1, at the bead portion, where the thickness is reduced. Said differently, the support is not as wide across ("thinner") at the bead portion as it is at other portions.

23. With respect to claim 15, applicant argues that the holder of 36 does not protect the free portion of the seal. Examiner notes there is no structure claimed to differentiate the holder from the prior holder. Inasmuch as applicant's claimed projection "protects the free portions", so does the prior art projection.

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24. With respect to claims 2, 18, 20, and 26, applicant argues that the use of material's having different coefficients of thermal expansion is opposite that of Holowach et al. Examiner notes that Holowach still teaches that structural limitations. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

25. Applicant argues that Gail does not show the free portion angled relative to the longitudinal and radial axes of the component. Applicant states that the disclosure by Gail that the bristles are angled at approximately ninety degrees is taken out of context. Applicant's argument is unclear. Gail discloses the angle is "approximately" ninety degrees. The term "approximately" suggests a range of values that is not precisely ninety degrees. This range overlaps with applicant's range that is angled relative to all radial axes of a component.

Conclusion

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

27. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Kyle whose telephone number is 571-272-7057. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

29. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Swann can be reached on 571-272-7075. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

30. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

mk


Chuck Y. Mah
Primary Examiner